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Analgesia enhancement and prevention of tolerance to morphine: beneficial effects of combined therapy with omega-3 fatty acids

Graciela E Escudero [1], Carolina B Romañuk [2], María E Toledo [1], María E Olivera [2], Ruben H Manzo [2], Carlos H Laino [1]

Affiliations
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Abstract

Objectives: Recent evidence associates omega-3 fatty acids (O3) with pain reduction. The aim of this work was to evaluate the antinociceptive effect of O3, either alone or in combination with morphine after acute and chronic administration in rats. As well, a new pharmaceutical mixture that allows the concomitant administration of O3 and morphine as an oral solution was developed.

Methods: Animals were fed on a control or an experimental diet supplemented with O3. They were subjected to the hot-plate test to assess analgesic effect and tolerance to the analgesic effect of morphine. The open-field test was carried out to determine if the differences in the response latency can be related to non-specific sedative effects.

Key findings: O3 dietary supplementation increased the response latency compared with the control group. Acute treatment with morphine in these groups resulted in an additive antinociceptive effect not related to locomotor activity. Chronic coadministration of morphine with O3 attenuated the development of tolerance. Oral administration of the new pharmaceutical mixture showed analgesic activity with a subtherapeutic dose of morphine.

Conclusion: This finding suggests a role for O3 as adjuncts to opioids in pain therapy and might contribute to the reduction of the occurrence of morphine side-effects.

Keywords: analgesia; fish oil; hot-plate test; omega-3 fatty acids; tolerance.

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